

## CLAIMS

What is claimed is:

1. A method for protecting associative memory entries, the method comprising:  
identifying a plurality of masks used for a plurality of associative memory entries;  
5 and  
determining a protected entry for each entry in the plurality of associative memory  
entries, said each entry including an original data portion and an original mask portion,  
the protected entry including a protected data portion and a protected mask portion, the  
protected data portion including the original data portion and a protection bit located at a  
10 bit position corresponding to the original mask portion, and the protected mask portion  
including the original mask portion and a mask to enable the protection bit corresponding  
to the original mask portion and to mask protection bits corresponding to other masks of  
the plurality of masks;  
wherein the protection bit is determined by a parity or other error protection  
15 calculation on a result of the original data portion masked with the original mask portion.
2. The method of claim 1, comprising programming an associative memory with  
each of said protected entries.
3. The method of claim 2, wherein said programming the associative memory  
with each of said protected entries includes programming each of said protective entries  
20 in two consecutive locations in the associative memory.
4. The method of claim 3, comprising performing a lookup operation in the  
associative memory based on a protected lookup word.

5. The method of claim 4, wherein the protected lookup word includes a lookup word original data portion and a lookup word protected data portion, the lookup word protected data portion including a plurality of bits, each of the plurality of bits being determined by a parity or other error protection calculation on a result of the lookup word original data portion masked with a different one of the plurality of masks.

6. The method of claim 5, wherein the plurality of masks consists of  $n$  masks and the lookup word protected data portion consists of  $n$  bits.

7. The method of claim 2, comprising performing a lookup operation in the associative memory based on a protected lookup word.

8. The method of claim 7, wherein the protected lookup word includes a lookup word original data portion and a lookup word protected data portion, the lookup word protected data portion including a plurality of bits, each of the plurality of bits being determined by a parity or other error protection calculation on a result of the lookup word original data portion masked with a different one of the plurality of masks.

9. The method of claim 8, wherein the plurality of masks consists of  $n$  masks and the lookup word protected data portion consists of  $n$  bits.

10. The method of claim 1, wherein the plurality of masks consists of  $n$  masks and the mask in the protected mask portion consists of  $n$  bits.

11. A method for protecting associative memory entries, the method comprising:  
determining a protected entry for each original entry of a plurality of original  
associative memory entries, the protected entry including the original entry and one or  
more protection bits, wherein said one or more protection bits are determined by a parity  
5 or other error protection calculation on the original entry; and  
programming an associative memory with said each determined protected entry.

12. The method of claim 11, wherein said programming the associative memory  
with said each determined protected entry includes programming each of said each  
determined protected entry in two consecutive locations in the associative memory.

10 13. The method of claim 11, comprising:  
determining a protected lookup value based on an original lookup value, the  
protected lookup value including the original lookup value and one or more protection  
bits determined by said parity or other error protection calculation on the original lookup  
value; and  
15 performing a lookup operation in the associative memory based on the protected  
lookup value.

14. An apparatus for protecting associative memory entries, the method  
comprising:  
means for determining a protected entry for each original entry of a plurality of  
20 original associative memory entries, the protected entry including the original entry and  
one or more protection bits, wherein said one or more protection bits are determined by a  
parity or other error protection calculation on the original entry; and  
means for programming an associative memory with said each determined  
protected entry.

15. The apparatus of claim 14, wherein means for said programming the associative memory with said each determined protected entry includes means for programming each of said each determined protected entry in two consecutive locations in the associative memory.

5           16. The apparatus of claim 14, comprising:

means for determining a protected lookup value based on an original lookup value, the protected lookup value including the original lookup value and one or more protection bits determined by said parity or other error protection calculation on the original lookup value; and

10           means for performing a lookup operation in the associative memory based on the protected lookup value.

17. A method for performing lookup operations on an associative memory, the method comprising:

15           determining a protected lookup word based on a lookup word, the lookup word including a lookup word original data portion, the protected lookup word including the lookup word original data portion and a plurality of error protection bits, each of the plurality of protection bits corresponding to one of a plurality of masks and being determined by a parity or other error protection calculation on a result of the original data portion masked with a different one of the plurality of masks; and

20           performing a lookup operation in the associative memory based on the protected data word.

18. An apparatus for performing lookup operations on an associative memory, the apparatus comprising:

means for determining a protected lookup word based on a lookup word, the lookup word including a lookup word original data portion, the protected lookup word including the lookup word original data portion and a plurality of error protection bits, each of the plurality of protection bits corresponding to one of a plurality of masks and being determined by a parity or other error protection calculation on a result of the original data portion masked with a different one of the plurality of masks; and  
means for performing a lookup operation in the associative memory based on the protected data word.

19. An apparatus for performing lookup operations, the apparatus comprising:

a protected lookup word generator for determining a protected lookup word, the protected lookup word generator configured to receive a lookup word, the lookup word including a lookup word original data portion, the protected lookup word including the lookup word original data portion and a plurality of error protection bits, each of the plurality of protection bits corresponding to one of a plurality of masks and being determined by a parity or other error protection calculation on a result of the original data portion masked with a different one of the plurality of masks; and  
an associative memory configured to receive the protected lookup word and to generate an associative memory result based on the protected lookup word.

20. The apparatus of claim 19, comprising a protective associative memory entry generator configured to determine a protected entry for each entry in a plurality of associative memory entries, said each entry including an original data portion and an original mask portion, the protected entry including a protected data portion and a  
5 protected mask portion, the protected data portion including the original data portion and a protection bit located at a bit position corresponding to the original mask portion, and the protected mask portion including the original mask portion and a mask to enable the protection bit corresponding to the original mask portion and to mask protection bits corresponding to other masks of the plurality of masks; wherein the protection bit is  
10 determined by a parity or other error protection calculation on a result of the original data portion masked with the original mask portion;

wherein the associative memory is programmed with said determined protected entry for each entry in the plurality of associative memory entries.

21. An apparatus for protecting associative memory entries, the apparatus  
15 comprising:  
means for identifying a plurality of masks used for a plurality of associative memory entries;  
means for determining a protected entry for each entry in the plurality of associative memory entries, said each entry including an original data portion and an  
20 original mask portion, the protected entry including a protected data portion and a protected mask portion, the protected data portion including the original data portion and a protection bit located at a bit position corresponding to the original mask portion, and the protected mask portion including the original mask portion and a mask to enable the protection bit corresponding to the original mask portion and to mask protection bits  
25 corresponding to other masks of the plurality of masks;

wherein the protection bit is determined by a parity or other error protection calculation on a result of the original data portion masked with the original mask portion.

22. The apparatus of claim 21, comprising:

means for programming an associative memory with each of said protected entries; and

5 means for performing a lookup operation in the associative memory based on a protected lookup word;

wherein the protected lookup word includes a lookup word original data portion and a lookup word protected data portion, the lookup word protected data portion including a plurality of bits, each of the plurality of bits being determined by a parity or other error protection calculation on a result of the lookup word original data portion  
10 masked with a different one of the plurality of masks.

23. The apparatus of claim 22, wherein said means for programming the associative memory with each of said protected entries includes means for programming each of said protective entries in two consecutive locations in the associative memory.